

# TABLE OF CONTENTS

## Section 1 – General (Policy and Procedure)

1-0	Routine Screening and Updating of Memos and Manuals (Metric)	Mar 1998
1-0	Memo Responsibility	Mar 1998
1-1	Division of Structures – Organization Chart	May 1993
1-2	Structure Design Technical Committees	Dec 1998
1-2 Attachment 1	Structure Design Technical Committee	Dec 1998
1-2 Attachment 2	Individual Technical Specialists	Dec 1998
1-2 Attachment 3	Individual Technical Committee	Sep 1993
1-3	Checking Procedure	Jan 1989
1-3 Attachment A	Checking Procedure	Jan 1989
1-4	Estimated Design Hours for Bridges and Related Structures	Apr 1992
1-4 Attachment A	Estimated Design Hours	Apr 1992
1-5	Distribution of Plans	Dec 1994
(pp 3-4)	Federal Highway Administration	Apr 1996
(pp 7-10)	Agreements Section	Apr 1996
1-6	Retention of Project Records	Apr 1991
1-6 Attachment A	Computer File Archive Worksheet (Example)	Apr 1991
1-7	Retention of Standard Sheet Backup Data	Dec 1990
1-7 Attachment A	Location of Backup Calculations for Standard Sheets (Form)	Dec 1990
1-8	Advance Planning Studies	Aug 1992
1-8 Attachment	Advance Planning Studies (Example)	Mar 1991
1-11	Stage Construction Future Widenings	Jul 1989
1-11 Attachment	Provision for Future Widening	Jul 1989
1-13	Disposition of Plans Specifications and Estimates (PS & E)	Mar 1989
1-13 Attachment	Form DPD-SD51 (Rev 5/78)	Mar 1989
1-15	Telephone Calls from Contractors and Suppliers	May 1989
1-16	Release of Structure's Electronic Contract Plans File	Mar 2002

1-20	“As Built Plans” for Bridges and Structures	Nov 1988
1-20 Attachment 1	Procedure on “As Builts” for State PS & E	Nov 1988
1-20 Attachment 2	Procedure on “As Builts” for Local Agency	Nov 1988
1-21	Information to Department of Fish and Game	Oct 1992
1-21 Attachment A	Form DS-D0011	Oct 1992
1-22	Scheduling Graph	Apr 1989
1-22 Attachment	Office of Structure Design Scheduling Bridge Projects	Apr 1989
1-23	Hydraulic and Hydrologic Information	Oct 2003
1-29	Type Selection Review Meeting	Jul 2001
1-29 Attachment 1	Type Selection Form	Jul 2001
1-29 Attachment 2	Request for Type Selection Meeting Form	Jul 2001
1-29 Attachment 3	Items of Consideration in Type Selection	Jul 2001
1-29 Attachment 4	Type Selection Recommendations	Jul 2001
1-32	Use of Trade Names in Plans and Specifications	Apr 1989
1-32 Attachment	Trade Names – (From PS & E Guide)	Apr 1989
1-35	Foundation Data (Metric)	Mar 1998
1-36	Structure Project Engineer’s Responsibility for Monitoring Delivery of PS & E Packages	Mar 1991
1-37	Duties of Project Designer	Apr 1995
1-38	Project Administrative Records	May 1989
1-38 Attachment A	Correspondence Record	May 1989
1-38 Attachment B	Telephone Memo	May 1989
1-38 Attachment C	Project Engineer’s Checklist	May 1989
1-38 Attachment D	Print Distribution	May 1989
1-38 Attachment E	Historical Cost Record	May 1989
1-38 Attachment F	Check List (Final Check on Completed Sets)	May 1989
1-38 Attachment G	Check List (Check on Road Plans)	May 1989
1-39	Communication with Field Personnel	May 1989
1-40	Processing Standard Plans and Bridge Standard Detail Sheets	Aug 1986
1-45	Availability of Structure Slides	Feb 1989
1-46	Process for Establishing Depth of Footings to Compensate for Expected Scour	Feb 1990

## Section 2 – Plan Preparation

2-1	Detailing Contract Plans in Metric	Apr 1996
2-1 Attachment A	Preferred Metric Scale	Apr 1996
2-2	Deck Contours	Dec 1988
2-2 Attachment	Form DS-D134 (Rev 12/88)	Dec 1988
2-11	Bridge Numbering System(Metric)	May 1996
2-25	Review of Road Plans	May 1989
2-25 Attachment	Routing and Transmittal of Road Plans	May 1989

---

## Section 3 – Piles

3-0	Pile Foundation Design	Mar 1989
3-1	Deep Foundations(Metric)	Dec 2000
3-1 Attachment 1	Pile Data Table Examples(Metric)	Dec 2000
3-1 Attachment 2	CIDH Pile Inspection Pipes(Metric)	Dec 2000
3-1 Attachment 3	Standard CIDH Pile Sizes (Metric)	Dec 2000
3-4	Piles Adjacent to Existing Roadway or Private Property	Oct 1988
3-6	Large Diameter Hollow Prestressed Driven Piles	Oct 1988

---

## Section 4 – Footings

4-1	Spread Footings	Nov 2003
4-1 Attachment 1	Format for Final Foundation Report	Nov 2003
4-2	Superimpose Footing Locations on Log of Test Borings Sheet	Oct 1988

---

## Section 5 – Abutments and Retaining Walls

5-1	Abutments	Oct 1992
5-1	Abutments(Metric)	May 1996
5-2	Diaphragm Abutments(Metric)	May 1996
5-3	Structure Approach	Dec 1992

5-3	Structure Approach(Metric)	May 1996
5-3 Attachment A	Selection Process For Structure Approach	Dec 1992
5-3 Attachment A	Selection Process For Structure Approach Pavement System on PCC Pavements(Metric)	May 1996
5-3 Attachment B	Selection Process For Structure Approach Pavement System on AC Pavements	Dec 1992
5-3 Attachment B	Selection Process For Structure Approach Pavement System on AC Pavements(Metric)	May 1996
5-7	Retaining Wall Safety Railing	Jul 1988
5-8	Mechanically Stabilized Embankment	Jan 1991
5-8 Attachment A	Implementation of PS&E	Jan 1991
5-8 Attachment B	Outline of Design Responsibilities	Jan 1991
5-10	Slope Treatment Under Structures	Apr 1989
5-12	Earth Retaining Structure Using Tiebacks	Aug 1990
5-14	Review of Working Drawings for Tieback Anchors	Oct 1988
5-16	Review of Working Drawings for Proprietary Earth Retaining Systems	Apr 1992
5-17	Earth Retaining Structures (Costs)	Feb 1989
5-17 Attachment	Earth Retaining Structures (Costs)	Feb 1989
5-18	Soil Nail Walls	Jan 1991

---

## **Section 6 – Bents and Piers**

6-1	Column Analyses Considerations	Jun 1990
6-1	Column Analyses Considerations(Metric)	Oct 2001
6-5	Reinforced Concrete Pier Walls(Metric)	May 1996
6-5 Attachment 1	Percentage and Spacing Requirements for Pier	May 1996
6-5 Attachment 2	Wall Reinforcement(Metric) Pier Wall Example Reinforcement for Lightly Loaded Walls(Metric)	May 1996

---

## **Section 7 – Bearing & Expansion Devices**

(pp 7-8)	Friction for Seismic Analysis	Mar 1996
7-1	Bridge Bearings	Jun 1994
7-1 Attachment 1	Prestress Shortening	Jun 1994

7-1 Attachment 2	Structure for Examples 2 and 3	Jun 1994
7-1 Attachment 3	Structure for Examples 4 and 5	Jun 1994
7-1 Attachment 4	PTFE/Spherical Expansion Bearing Details	Nov 1993
7-10	Bridge Deck Joints and Deck Joint Seals	Sep 1994
7-10 Attachment 1	Calculation of Points of No Movement	Sep 1994
7-10 Attachment 2	Joint Movements Calculations	Sep 1994
7-10 Attachment 3	Maximum Contributory Structure Length	Sep 1994
7-10 Attachment 4	Prestress Shortening	Sep 1994
7-10 Attachment 5	Approximate Properties for Preformed Elastomeric Joint Seals Type B	Sep 1994
7-10 Attachment 6	Typical Alternative Joint Seal Assembly	Sep 1994
7-10 Attachment 7	Size Blockout Dimensions	Sep 1994
7-10 Attachment 8	Typical Modular Joint Seal Assembly	Sep 1994
7-10 Attachment 9	Bridge Deck Joint Rehabilitation Projects	Sep 1994

---

## **Section 8 – Deck Slabs**

8-2	Protection Against Deicing Chemicals and Freeze-Thaw Environment	Aug 1994
8-2 Attachment A	California State Highway Environmental Areas	Jun 1989
8-2 Attachment B	California State Highways Listing by Environmental Area and Post Mile	Jun 1989
8-5	Overlays on Existing Bridge Decks(Metric)	Mar 1996
8-6	Use of Prestressed Concrete Deck Panel Stay-in-Place Forms	Apr 1983
8-7	Permanent Steel Deck Forms for Precast Concrete and Steel Superstructures	Jul 1994

## Section 9 – Existing Bridges

9-1	Dependent Dimension	Mar 1989
9-2	Maintenance Rating(Metric)	May 1996
9-2	Standard Permit Rating and Design Vehicles With Purple Loads(Metric)	May 1996
9-3	Widening Existing Bridges	Apr 1991
9-4	Live Loads and Stresses Historical Background	Jan 1986
9-5	Removal of Existing Bridges	May 1986
9-6	Permit Upgrading	Dec 1982
9-7	Strengthening Steel Girder Bridge for Live Loads	Sep 1989
9-7 Attachment A	Strengthening Steel Girder Bridge for Live Loads	Sep 1989
9-8	Widening Closed End Cellular Abutments	Feb 2002

---

## Section 10 – Reinforced Concrete Box Girders

10-1	Reinforced Concrete Strength Requirements	Apr 1999
10-5	Protection of Reinforcement Against Corrosion Due to Chlorides, Acids and Sulfates	Jan 2002
10-6	Use of Prefabricated Epoxy Coated Reinforcement in Marine Environment	Jan 2002

---

## Section 11 – Precast and/or Prestressed

11-1	Review of Working Drawings – Prestressed Concrete	Jun 1993
11-1 Attachment 1	Cast-in-Place Post Tensioning System Contractors	Oct 1996
11-3	Designer's Check List for Prestressed Concrete	Mar 1994
11-3	Designer's Check List for Prestressed Concrete(Metric)	Nov 1996
11-4	Simple Span Cast-in-Place Post Tensioned Girders	Dec 1988
11-8	Design of Precast Prestressed Girders	Mar 1994
11-8	Design of Precast Prestressed Girders(Metric)	Nov 1996
11-9	Economical Precast Girders	Mar 1994
11-18	Stressing Incomplete Bridges	May 1989
11-21	Strength Requirement – Prestressing Steel	Nov 1996

11-21	Strength Requirement – Prestressing Steel(Metric)	Jan 1994
11-23	Use of $P_f \times e$ Diagrams	
11-28	Prestressed CIP Box Girders C.G's for Prestressing Steel	Jan 1994
11-28	Prestressed CIP Box Girders C.G's for Prestressing Steel(Metric)	Nov 1996
11-28 Attachment 1	Prestressed CIP Box Girders C.G's for Prestressing Steel	Jan 1994
11-28 Attachment 1	Prestressed CIP Box Girders C.G's for Prestressing Steel(Metric)	Nov 1996
11-28 Attachment 2	Clearance Requirement for Ducts	Jan 1994
11-28 Attachment 2	Clearance Requirement for Ducts(Metric)	Nov 1996
11-28 Attachment 3	“D” Chart For Cast-In-Place Girders	Jan 1994
11-28 Attachment 3	“D” Chart For Cast-In-Place Girders(Metric)	Nov 1996
11-30	Horizontal Curvature Friction in Post-Tensioning	Jun 1992
11-30	Horizontal Curvature Friction in Post-Tensioning(Metric)	Nov 1996
11-31	Curved Post Tensioned Bridges	Mar 1994
11-31	Curved Post Tensioned Bridges(Metric)	Nov 1996
11-34	Hinge Curl	Sep 1994
11-34	Hinge Curl(Metric)	Nov 1996

## CONTENTS – VOLUME II

### Section 12 – Steel

12-1	Review of Working Drawings – Steel Structures	Jul 1989
12-11	Galvanizing Tanks	Apr 1989
12-15	Catwalk on Steel Bridges	Jun 1989
12-17	Field Welding Near Bearing Pads	Jun 1989
12-28	Use of Structural Steel	Jun 1989

---

### Section 13 – Pedestrian Structures

13-1	Pedestrian Grade Separations (Overpasses and Underpasses) Compliance for the Physically Handicapped	Jun 1989
13-2	Physically Handicapped Compliance Approval	Jun 1989

---

### Section 14 – Railings and Barriers

14-3	Double Railings on Bridges	Oct 1988
14-4	Pipe Handrailing – Pipe Railing	Jul 1988
14-6	Bridge Railing Replacement	Feb 1989
14-6 Attachment	Bridge Barrier and Culvert Railings	Sep 1994
14-8	Chain Link Fencing on Structures	Oct 1988
14-10	MBGR Connection to Barrier Railing Type 9, 9-11	May 1989
14-10 Attachment 1	Modified MBGR Connection Details – Barrier Railing Type 9 and 9-11 – Sheet 1 of 2	May 1989
14-10 Attachment 2	Modified MBGR Connection Details – Barrier Railing Type 9 and 9-11 – Sheet 2 of 2	May 1989
14-14	Crash Cushions	Jan 1989
14-14 Attachment A	Crash Cushions	Jan 1989
14-14 Attachment B	Design Guide – Crash Cushion – Sand Filled Typical Installations	Jan 1989



14-14 Attachment C	Vehicle Crash Cushion Layout – Gores at Existing Structure Columns	Jan 1989
14-14 Attachment D	Vehicle Crash Cushion – Hex Foam	Jan 1989
14-14 Attachment E	Temporary Crash Cushion (CZ G R E A T)	Jan 1989
14-19	Temporary Railing	Apr 1990

---

## **Section 15 – Structural Analysis**

15-2	Concrete Girder Spacing	May 1989
15-14	Loads for Temporary Highway Structure	Feb 2004
15-15	Materials Hauling Equipment Loading	Oct 1989
15-16	Crane Loads on Structures While Under Contract Administration	Jul 1969
15-17	Future Wearing Surface	Dec 1988
15-18	Additional Dead Load on Bridge Decks	Sep 1988
15-20	Live Load Distribution by Three Dimensional Analysis	Jun 1988
15-20 Attachment A	Concrete Box Girder Live Load Distribution by Lanell for Special Loads	Jun 1988

---

## **Section 16 – Deflections**

16-3	Composite Girder Deflection	Jun 1989
16-3 Attachment	Composite Girder Deflection	Jun 1989
16-4	Continuous Steel Girder Deflections	Jul 1989
16-4 Attachment	Continuous Steel Girder Deflections	Jul 1989

---

## **Section 17 – Railroads**

17-100	General	Apr 1989
17-101	Correspondence with Railroads	Mar 1989
17-102	Railroad Standard Drawings	Mar 1989
17-105	Clearances	Apr 1992
17-106	Modifications That Affect Railroad Clearance	Apr 1989
17-110	Falsework Requirements for Various Railroads	Apr 1992

17-115	Railroad Bridges Superstructure Depths	Mar 1991
17-120	Special Requirements of Railroad Companies	Jan 1991
17-121	Western Pacific Railroad Company	Apr 1989
17-125	Drainage at Overheads	May 1989
17-130	Railroad Live Loading and Impact	Apr 1989
17-135	Surcharge from Railroad Loading	May 1989
17-140	SPT Co Supplemental Requirements to Chapter 8 AREA Specifications	Aug 1989

---

## Section 18 – Drainage and Utilities

18-1	Bridge Deck Drainage	Jun 1989
18-1	Bridge Deck Drainage(Metric)	Sep 1996
18-2	Utilities and Openings for Future Utilities In Bridges	Feb 1990
18-2	Utilities and Openings for Future Utilities In Bridges(Metric)	Jul 1996
18-2 Attachment	Encroachments on Bridges	Feb 1990
18-2 Attachment	Encroachments on Bridges(Metric)	Jul 1996
18-3	Supply Lines, Communication Conduit and Sprinkler Control Conduit on Bridges	Dec 1990

---

## Section 19 – Estimating

No items are currently in this Section

---

## Section 20 – Seismic

20-1	Index to Seismic Related Memos	Apr 1990
20-2	Seismic Requirements for Stage Construction	Nov 1989
20-3	Restrainers at Hinges and Bearings	May 1994
20-4	Earthquake Retrofit Guidelines for Bridges	Mar/Oct 1995
20-4 Attachment A	STRUDL Modelling Guidelines	Mar/Oct 95
20-4 Attachment B	Design/Detail Guidelines	Aug 1996

pp 9 & 10	Composite Column Casings and Detailing Sheet	Aug 1996
20-4 Attachment C	Special Considerations	Mar 1995
20-4 Attachment D	Background and Ongoing Research Projects In Caltrans Retrofit Program	Mar 1995
20-5	Seismic Design Load	Jan 1991
20.5 Attachment A	Identifying Seismic Design Criteria in the General Notes	Feb 2003
20-6	Seismic Strength of Concrete Bridge Superstructures	Aug 2001
20-6 Attachment 1	Demand Procedure	Aug 2001
20-6 Attachment 2	Capacity Procedure	Aug 2001
20-7	Use of Ductility Procedures and Tools in the Seismic Retrofit of Bridges	Feb 1994
20-9	Design Recommendations “Ultimate Splice,” Hoops and Spirals	Nov 2002
20-9 Attachment 1	Strain Requirements in a Ultimate Splice (Metric)	Aug 2001
20-11	Establishing Bridge Seismic Design Criteria (Metric)	Jan 1999
20-12	Site Seismicity for Existing and Temporary Bridge Carrying Public Vehicular Traffic	Feb 2003

---

## Section 21

21-11	Mounting Signs and Placing Conduit	Sep 1988
21-11	Mounting Signs and Placing Conduit(Metric)	Jul 1996
21-12	Bridge mounted Sign – Barrier Mounted Sign	Aug 1991
21-13	Overhead Sign Structures	Nov 1988
21-19	Guidelines for Clearance to Construction Operations	Mar 1989
21-19	Guidelines for Clearance to Construction Operations(Metric)	Jul 1996
21-19 Attachment 1	Footing Excavation	Mar 1989
21-19 Attachment 1	Footing Excavation(Metric)	Jul 1996
21-19 Attachment 2	Pile Driving and Drilling Small CIDH Piles	Mar 1989
21-19 Attachment 2	Pile Driving and Drilling Small CIDH Piles(Metric)	Jul 1996
21-19 Attachment 3	Column Construction	Mar 1989
21-19 Attachment 3	Column Construction(Metric)	Jul 1996
21-27	Additional Dead Load on Bridge Decks	May 1968

21-35	Limits of Widths of Bridge Superstructures	Nov 1988
21-35	Limits of Widths of Bridge Superstructures(Metric)	Jul 1996
21-47	Lightweight Concrete	Mar 1986
21-52 and Attachment 1	Architectural Treatment of Walls and Columns	Sep 1993

---

## **Section 22 – Sound Walls**

22-1	Sound Wall Design Criteria	Jul 1989
pp 7-8	Figure 2: Cast-In-Place Sound Wall	Feb 1990
22-2	SoundWall Load Distribution	Feb 2004
22-5	Sound Wall Plans Format for Projects by Office of Structure Design	Nov 1988
22-10	Instructions for Using Standard Sound Wall Masonry Block Detail Sheets	Jun 1989
22-10 Attachment	Instructions for Using Standard Sound Wall Detail Sheets - Masonry Block	Jun 1989
22-20	Instructions for Using Standard Sound Wall – Precast Concrete Panel Detail Sheets	Jun 1989
22-20 Attachment	Instructions for Using Standard Sound Wall Detail Sheets – Precast Concrete Panel	Jun 1989
22-25	Instructions for Using Standard Sound Wall – Wood Plank, Plywood Sheet and Framed Plywood Panel Detail Sheets	Jun 1989
22-25 Attachment	Instructions for Using Standard Sound Wall Detail Sheets – Wood Plank, Plywood Sheet and Framed Plywood Panel	Jun 1989
22-30	Instructions for Using Standard Sound Wall – Composite Plaster Panel Detail Sheets	Jun 1989
22-30 Attachment	Instructions for Using Standard Sound Wall Detail Sheets - Composite Plaster Panel	Jun 1989
22-35	Instructions for Using Standard Sound Wall – Ribbed Steel Panels Detail Sheets	Jun 1989
22-35 Attachment	Instructions for Using Standard Sound Wall Detail Sheets - Ribbed Steel Panels	Jun 1989
22-50	Sound Wall – Concrete Masonry Blocks	Dec 1988
22-55	Sound Wall – Design Weight – Concrete Masonry Block	Nov 1988

## Section 23 – Underground Structures

23-1	Reinforced Concrete Box Culvert Design	Dec 1992
23-1	Reinforced Concrete Box Culvert Design	Mar 1998